

Remarks

Claims 1, 17, 23, 36 and 42 have been amended, and new claims 68-73 have been added.

This paper accompanies a Request for Continued Examination that is filed in response to a final Office action mailed on October 6, 2004.

In the final Office action, claims 1, 3-4, 8, 11, 17, 21, 22, 42, 44, 45, 49, 52, 56, 57 and 65 are rejected as being unpatentable over U.S. Pat. No. 4,656,676 to Medwell in light of Japanese Patent 64-68572. The final Office action takes the position that the Medwell reference discloses the basic claimed process of the invention, but does not teach a thermosetting resin-impregnated fabric having ceramic particles mixed therein. The Office action then takes the position that it would have been obvious to one of ordinary skill in the art to mix the ceramic particles of the Japanese reference in the thermosetting resin of the Medwell reference to arrive at the claimed invention. The claims are similarly rejected as being unpatentable over U.S. Pat. No. 5,794,271 to Hastings.

Applicant previously argued that the Japanese reference discloses the use of ceramic-infused resin to guide and trap heat therein, and actually causes the surface temperature of the cloth to increase. In contrast, in firefighter equipment, such as the helmet disclosed in the Medwell reference, it is generally desired to minimize heat retention and keep the surface temperature low. Thus, it was submitted that one of ordinary skill in the art would not be motivated to use the heat-retaining ceramic of the Japanese reference in the helmet of the Medwell reference, and that in fact the art teaches against such a proposed combination.

In response, the final Office action (at paragraph (a) of page 14) notes that the Medwell and Hastings reference are not restricted to use for firefighter equipment. However, it is submitted that in nearly all environments in which helmets are used, it is generally desired to minimize heat retention. For example, for soldiers or motorcyclists, helmets often trap heat to such a degree as to cause perspiration of the wearer which cause the wearer to remove the helmet. Thus it is submitted that applicant's argument in this regard retain merit.

At paragraph (b) of page 14 the Office action notes that firefighting equipment is not recited in the claims. However, applicants were not previously citing to "firefighting equipment" in the arguments as a manner to distinguish over the cited references. Instead the reference to firefighting equipment was included merely to support arguments advancing why it would not have been obvious to one of ordinary skill in the art to combine the cited references. In any case, the independent claims of this application have been amended to specify that the components manufactured using the claimed steps are for use in a firefighting environment.

At paragraph (c) of pages 14-15 of the Office action it is argued that: 1) the Medwell and Hastings references teach a process for making a helmet with certain ballistic/impact properties; 2) the Japanese reference teaches a process for improving heat reflectivity of a resin impregnated fabric; and 3) *hence* heat retention is a desirable property in a ballistic/impact helmet. However it is not understood how proposition #3 follows from #1 and #2. In fact, the Medwell/Hastings references and the Japanese reference are directed to wholly separate and distinct areas of technology. It is not understood how one reference disclosing a helmet and another reference disclosing a resin impregnated fabric "hence" or necessarily shows that it would be logical to combine the teachings of those references.

In addition the statement in the Office action that heat retention is a desirable property in a helmet is respectfully traversed. Instead, applicant submits quite the opposite, that in fact heat *retention* is not desired in a helmet. Although heat *reflectivity* may be desired, if a helmet could have both high heat reflectivity (i.e. reflect external heat) and low heat retention (does not trap internal heat), this may be a desirable quality.

In paragraph (d) of page 15 of the final Office action it is argued that the Japanese reference teaches that by adding a ceramic material, a "heat shield" is provided (i.e. a layer that reflects/traps heat in both directions). However, it is submitted that this is not the teachings of the Japanese reference. Instead, the Japanese reference repeatedly and consistently stresses the "heat retaining" qualities of the ceramic infused cloth. It is submitted that there exist well-known materials which can efficiently reflect heat one on side of the material more efficiently than the

other side, and allow heat to more easily pass through from side than the other (for example materials coated with a metal foil on one side only, aluminized materials and the like). Thus it is submitted that the proposition advanced in the Office action is not universally true. In other words, the Japanese reference does not necessarily teach a heat shield which reflects heat equally in two directions, but by its own terminology, as best understood by the translation, only discloses heat retention properties. Thus applicant submits that the Office action does not provide sufficient motivation for combining the references.

New claims 68-72 depend from independent claims 1, 17, 23, 36 and 42 and specify that the recited steps of those claims are carried out to provide a helmet with relatively high heat reflectivity. Thus new claims 68-72 further define over the cited references. New claim 73 depends from claim 42 and specifies that the method further comprises the step of coupling a set of reinforcing ribs to the generally continuous generally hemispherical bowl portion. Such ribs can be seen, for example, as ribs 20 in Fig. 1.

In addition, applicant submits herewith various secondary considerations to support the patentability of the invention. In particular, attached hereto is the Declaration of the Teresa Lawson, Helmet Production Manager of the assignee of this application.

As can be seen in paragraph 11 of the Declaration, for the period of December 2001-November 2002, Lion Apparel, Inc. (the assignee of this application) sold 7,332 Ceramic Helmets, which represented 28% of all helmets sold by Lion Apparel during that period. As can be seen at paragraphs 12 and 13, for the period of December 2002-November 2003, Lion Apparel sold 9,727 Ceramic Helmets, which represented 40% of all helmets sold by Lion Apparel during that period, and for the period of December 2003-November 2004, Lion Apparel sold 7,954 Ceramic Helmets, which represented 38% of all helmets sold by Lion Apparel during that period. As can be seen at paragraph 16, for the period of March 2003-February 2005 Lion Apparel sold 18,994 of the Ceramic Helmets.

As can be seen at paragraph 10 of the Declaration, Lion Apparel currently sells 5 other helmet designs. As can be seen at paragraph 16 of the Declaration, for the period of March 2003-

February 2005 the protective helmet that is formed by the claimed method of this application was Lion Apparel's top selling helmet. As can be seen at paragraph 17, the protective helmet that is formed by the claimed method of this application has a similar advertising budget as the other helmets sold by assignee. In fact the protective helmet that is formed by the claims, and the other helmets referenced in the Declaration, are typically advertised together, yet the helmet formed by the claims still outsells the other helmets. Thus the attached Declaration this shows significant commercial success of the invention, supporting the non-obviousness thereof.

As can be seen at paragraph 4 of the Declaration, testing by an outside company has shown that a helmet with ceramic particles that is formed by the claimed method of this application has a mean maximum tensile strength of 15,483 psi, as compared to 10,477 psi for a helmet without ceramic particles. Thus the helmet with ceramic particles shows a 48% increase in maximum tensile strength over a helmet without ceramic particles.

As can be seen at paragraph 5 of the Declaration, testing has shown that a protective helmet that is formed by the claimed method of this application has a mean flexural strength of 28,183 psi, as compared to 21,158 psi for a helmet without ceramic particles. Thus the helmet with ceramic particles shows a 33% increase in flexural strength over a helmet without ceramic particles.

As can be seen at paragraph 6 of the Declaration, testing has shown that a protective helmet that is formed by the claimed method of this application has a 6% increase in impact resistance (9.5 inches vs. 9 inches) over a helmet without ceramic particles as measured using the drop dart evaluation method. As can be seen in paragraph 7 of the Declaration, testing has also shown that a protective helmet that is formed by the claimed method of this application has a 3% increase in impact resistance (8.15 ft-lbs/in v. 7.9 ft-lbs/in) over the a helmet without ceramic particles as measured using the izod notched impact test. Although paragraph 8 of the Declaration shows a slight decrease (3%) of the impact resistance in the izod unnotched impact test, on balance the testing shows significant gains in overall performance of the helmet.

Serial No.: 09/689,131
Attorney Docket No.: 520219-273
Preliminary Amendment

The increased tensile strength, flexural strength and impact resistance are strong evidence of unexpected results given that ceramic materials are typically considered to be relatively brittle materials. Thus, in addition to the increased heat reflectivity, the protective helmet formed by the claimed method of this application is generally stronger and more impact resistant, thus supporting the patentability of the invention.

Accordingly, due to the lack of a motivation to combine the cited references and the fact that the claims are directed to manufacturing equipment for use in a firefighting environment, along with the secondary evidence of commercial success and unexpected results in the form of increased strength and impact resistance, it is submitted that the claim are patentable over the cited references. Thus it is believed that the application is in a condition for allowance and a formal notice thereof is earnestly solicited.

The Commissioner is hereby authorized to charge any additional fees required, including the fee for an extension of time, or to credit any overpayment to Deposit Account 20-0809.

The applicant(s) hereby authorizes the Commissioner under 37 C.F.R. §1.136(a)(3) to treat any paper that is filed in this application which requires an extension of time as incorporating a request for such an extension.

Respectfully submitted,

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